

Infants and toddlers experience a lot of language use

Where's your nose?

Did you brush your teeth?

Look at the bunny!

etc.



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And so they start to *recognize some words*, at least as familiar sounds they've heard before:

Mandel, Jusczyk, & Pisoni

4.5-month-olds, listening preference task

- Infants listen longer to their *own names* than other names (e.g., Katie vs. Kevin)

Spoken word recognition gets more accurate with age & experience



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They also learn the *meanings* of words,
and *rules* for combining them (grammar)

Where's your
nose?

Did you brush
your teeth?

Look at the
bunny!

etc.



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How do they do this?

Today (and next time):

First words and sentences

What do children know about their words and sentences?

- And how do they learn it? (More on this next time!)

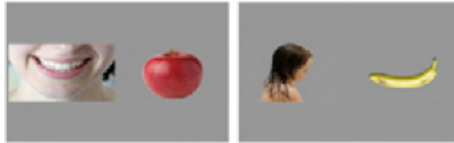
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Infants learn *something* about the meanings of some words before 9 months

(Bergelson & Swingley, 2012)

- 6- to 9-month-olds saw pairs of pictures

e.g.,



- And heard their own mothers name one object on each trial:

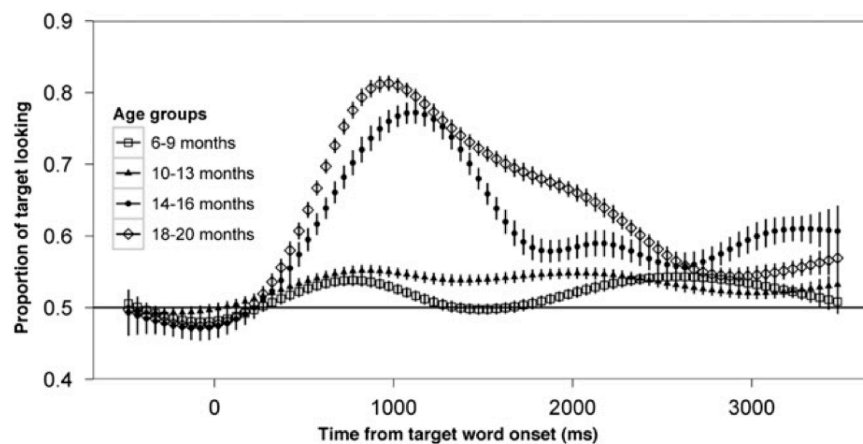
e.g., "Do you see the apple?"

"Do you see the hair?"

- Infants looked more at matching picture!!

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Infants this age are not very good at word comprehension ...



but still, they're attaching meaning to words (with some success!) well before 1 year of age

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First words: The 'one word' stage

- Children begin to attach meanings to some words in the 2nd half of the first year
- First recognizable words produced ~ 12-14 months
 - Mostly one word at a time (holophrases)
 - New words appear in child's production vocabulary slowly
- What words?
 - not:* although, or, but, the, until ← function words
 - instead:* ball, cookie, etc ← content words

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Names for things plus ...

Nelson (1973)

- 51% category names for things
- the rest?
 - Action: up, off, gone
 - Social: bye, no, quit-it
 - Routines: bath, lunch
 - Modifiers: hot

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A Striking Error at 1-Word Stage

<u>Word</u>	<u>First Referent</u>	<u>Over-extensions</u>
bird	sparrows	cows, dogs, cats, any moving animal
buti	ball	toy, radish, stone spheres at park entrance
pin	pin	crumb, caterpillars
cola	chocolate	sugar, tarts, grapes, figs, peaches
tick-tock	watch	clocks, gas meter, firehose on spool, bath scale with round dial

Thompson & Chapman (1977)

- Tested 1-word speakers
- ... Who over-extended some words

Pairs of pictures:



"Where's the dog?"

Thompson & Chapman found:

- Children chose correctly for many words they over-extended.



"Where's the dog?"

Why do you think children over-extend words more in production than in comprehension?

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Word Combinations: The 2-Word Stage

- ~ 6 months after first words
- Many children begin combining words

What are these sentences like?

- mostly 2 words at a time
- still all content words (leaving out function words)
 - "telegraphic" speech

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Word Combinations: The 2-Word Stage

Eve at 18 months

Child: More cookie.

Mother: You want more cookies?

Child: Where Fraser?

Mother: Oh, there's Mr. Fraser.

Child: Fraser water.

Mother: I don't think Mr. Fraser wants any water.

Child: Fraser hat.

Mother: Oh, that's Fraser's hat.

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Notice ambiguity without function words

"Mommy sock"

What could this mean?

Lois Bloom (1970):

Mommy (put) sock (on Kathryn)

Agent-Object

and

Mommy ('s) sock

Possessor-Possessed

Given "rich interpretation" of sentences in context:

- Telegraphic speakers get word order correct early
- *Word order: The rudiments of syntax*

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Meanings of word combinations

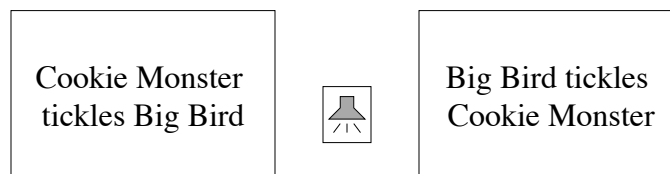
- Broad set of semantic relations (Brown, 1973)

Agent-Action	Mommy fix.
Agent-Object	Fraser water. (Mommy sock.)
Action-Object	Put light.
Action-Location	Put floor.
Object-Location	Tractor floor.
Possessor-Object	Fraser hat. (Mommy sock.)
Object-Attribute	Pillow dirty.
Demonstrative-object	That doggy.

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When do children comprehend word order?

- Hirsh-Pasek & Golinkoff (1996)
- Subjects: 16 - 18 months (mostly 1-word speakers)



Hear 1 sentence:

"Cookie Monster is tickling Big Bird!"

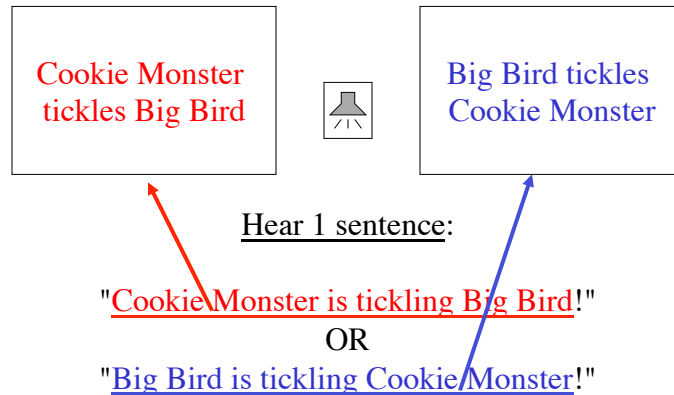
OR

"Big Bird is tickling Cookie Monster!"

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Children looked longer at matching video

- So: even 1-word speakers know something about English word order



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After 2-Word Stage?

- Gradual increase in length of sentences
- Function words gradually added

Eve at 26 months:

I want more grape juice.

I want some of yours.

Papa found it for me in the paper.

I eating counter. (M: That's not a very good thing to eat.)

Well, where the other jar?

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Acquisition of function words

- morphemes, not just words
 - any meaningful element
- (1) At first, regular and irregular correct
 - e.g., run → **ran**
 - walk → walk**ed**
 - foot → **feet**
 - shoe → shoe**s**
- (2) Later, occasionally over-generalize
 - e.g., run → run**ned**
 - foot → foot**s**

What does this tell us?
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Comprehension of Function Words?

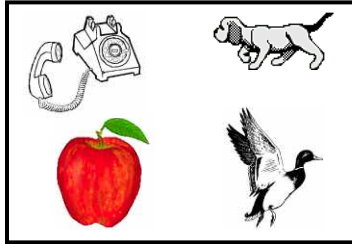
- Telegraphic speech lacks function words.
- Do children not know about them at all?

Gerken & McIntosh, 1993

- 24-mos., mlu (mean length utterance) = 1 - 2.5
- picture-choice comprehension task, 4 conditions:

Grammatical:

"Find **the** bird
for me!"



Missing:

"Find --- bird
for me!"

Ungrammatical:

"Find **was** bird
for me!"

Nonsense:

"Find **gub** bird
for me!"

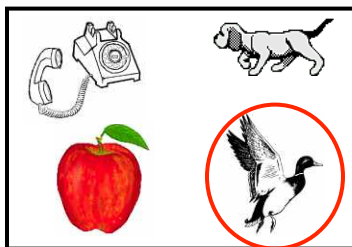
Compare accuracy across conditions.

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Gerken & McIntosh, 1993

Grammatical:

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Missing:

"Find --- bird
for me!"

Ungrammatical:

"Find **was** bird
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Nonsense:

"Find **gub** bird
for me!"

- Result: Children picked more accurately if they heard the correct function word. (even 1-word speakers) **WHY?**

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Further results:

- Similar results with 18-month-olds in a looking-preference task!

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What do children know about their words & sentences?

- When does language comprehension or production reflect knowledge of abstract categories and rules as well as of words?
- *** *The problem of familiar words.*

Eve at 26 months:

I want more grape juice.

I want some of yours.

Papa found it for me in the paper.

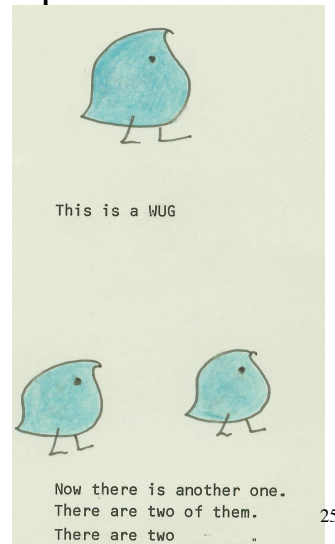
I eating counter. (M: That's not a very good thing to eat.)

Well, where the other jar?

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A key diagnostic for grammatical category knowledge: made-up words

Once we know rules of
combination involving a
category, we can apply that
rule to new category
members.



What about the category "Noun"?



Look, a gazzer!

What about the category "Noun"?



Look, a gazzer!



Nouns:

- ____-s
- a ____
- the ____
- Subject of sentence
- Object of verb
- Object-category meanings

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2-year-olds categorize a new word *as a noun* and generalize it to new contexts

Tomasello & Olguin (1993)

- 24-month-olds
- learned 4 new words in 7 sessions

Training: 4 conditions

- Subject only: *The gazzer is kissing Ernie.*
- Object only: *Big Bird is pushing the peri.*
- Neither: *Look! A toma.*
- Both Subject & Object

Test: Elicit uses of the new words from children ("What's happening?")

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Results:

- *2-year-olds used the new nouns in new ways*
 - e.g., Hear 'gazzer' only as subject, also use it as object.
 - e.g., Hear 'gazzer' only as singular, say it in the plural.

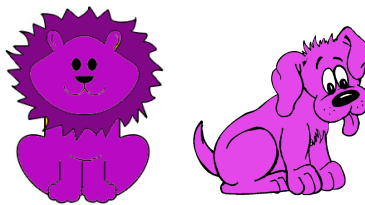
Nouns:

- ____-s
- a ____
- the ____
- Subject of sentence
- Object of verb
- Object-category meanings

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Infants use Noun category to guide word learning

- Waxman & Booth: 14-month-olds



Familiarization Trials (on each trial, see two *purple animals*):

- Accompanied by a new word. *What could the word mean?*

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Infants use Noun category to guide word learning

- Waxman & Booth: 14-month-olds



... etc.

All *animals*?

or

All *purple*?

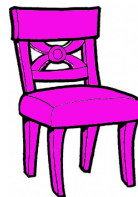
That depends on what kind of word it is:

- Noun: This one is a blicket, and this one is a blicket!
- Adjective: This one is blickish! and this one is blickish.
- No word: Look at this one. And look at this one.

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Test trials:

- Measure looking time to 2 new pictures:



- Noun condition: Find the blicket!
- Adjective condition: Find the blickish one!
- No Word condition: Find one now!

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Results (14-month-olds):

- Noun condition
 - Infants look longer at green HORSE (category match) than purple chair (property match)
- Infants in Adjective condition & No-Word conditions
 - Look about equally at green horse & purple chair

Interpretation:

- 14-month-olds know that nouns (*This one is a blicket!*) refer to categories of things.
- But do not interpret just any new word in the same way (not adjectives, *This one is blickish!*)

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More linguistic cues to word meanings

Katz, Baker, & MacNamara

- Introduce 2 new dolls to 18-month-olds
- Label ONE with a new word
 - *proper name condition*: "This is Dax!"
 - *common noun condition*: "This is a dax!"
- Test:
 - proper name condition: "Hand me Dax!"
 - common noun condition: "Hand me a dax!"
- Measure:
 - How often do children pick the same doll that was originally labeled?

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Results:

- Children pick the same doll more often in the Proper Name than in the Common Noun condition
- Suggests they have already learned that
 - "Dax" names an individual
 - "a dax" names a category
- Further results:
 - Chose at chance for "Dax" OR "A dax" if they used blocks instead of dolls! *why might this be?*

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So ... even toddlers use some grammatical category knowledge in word learning

Nouns:

- ____-s
- a ____
- the ____
- Subject of sentence
- Object of verb
- *Object-category meanings*

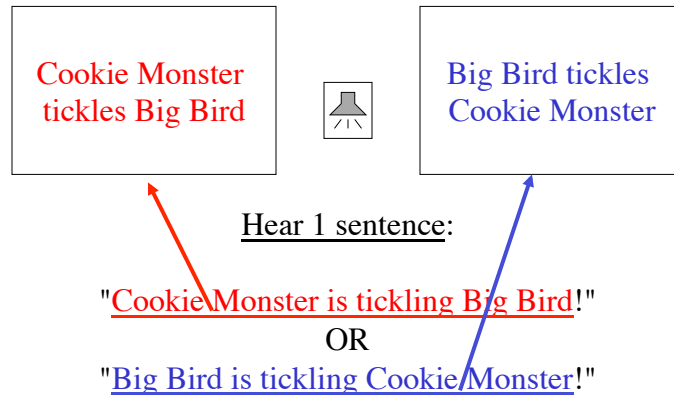
Proper Noun:

- This is ____!
- *Name for individual*

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What about evidence of abstract category use for verbs & whole sentence-structures?

- Recall that 18-month-olds use English word order to understand sentences with familiar verbs.



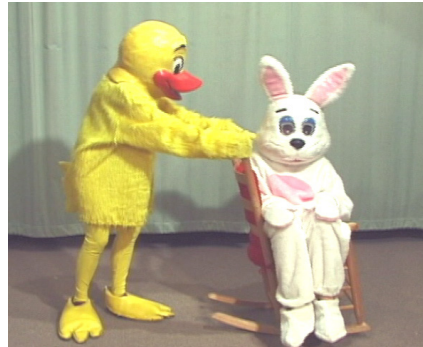
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Word order: Is this something the children know about tickle?

- e.g., the tickler comes first?
- Or is it something they know about Transitive Verbs in general?
 - the *doer of the action* comes first?

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Word Order (21 months)



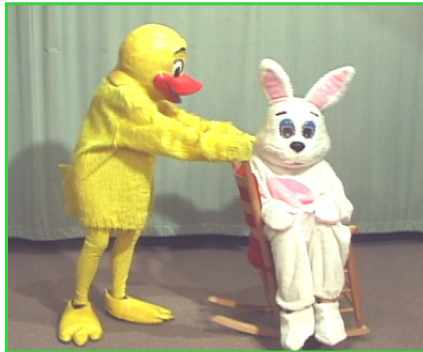
The bunny is pilking the duck.

OR

The duck is pilking the bunny.

Gertner, Eisengart, & Fisher, 2006 39

Word Order (21 months)



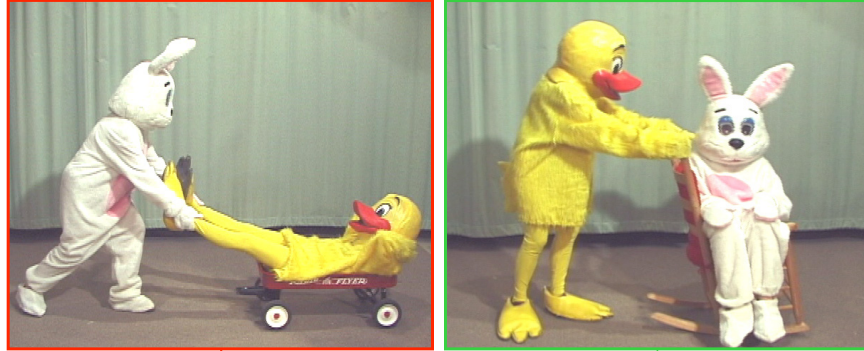
The **bunny** is pilking the **duck**.

OR

The **duck** is pilking the **bunny**.

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Word order: Do children know more than
'first noun is agent'? (21 months)



Who is pilking the **duck**?

OR

Who is pilking the **bunny**?

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Word order: Is not something the children
know about tickle

- Children have to learn the word order of English
- But once they do ...
 - They quickly transfer this learning to new transitive verbs
 - Suggests they learned a general rule for understanding transitive sentences in English:
The subject (or first noun) is the agent of action

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Developing a system for rapid online language comprehension

- Basic fact about sentence comprehension in adulthood:
 - Sentence comprehension is *incremental*
 - We interpret each part of a sentence as it unfolds, not waiting until the sentence is complete to compute meaning
 - Next ... one simple developmental example:

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Rapid use of *grammatical gender* in word comprehension (Lew-Williams & Fernald, 2007)

- Spanish nouns are marked for gender:
 - masculine (el zapato, el carro)
 - or feminine (la pelota, la galleta)

Do children use gender-marked articles to predict which word is about to be mentioned?

Subjects: 3-year-olds & their parents, speakers of Spanish

Task: Look at pairs of pictures while hearing sentences that name one of the pictures

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Rapid use of *grammatical gender* in word comprehension (Lew-Williams & Fernald, 2007)

3-year-olds view pairs of pictures while hearing sentences that name one of the pictures

Same Gender trials:



"Encuentra la pelota!"

Find the ball!

(distracter = la galleta)

Different Gender trials:



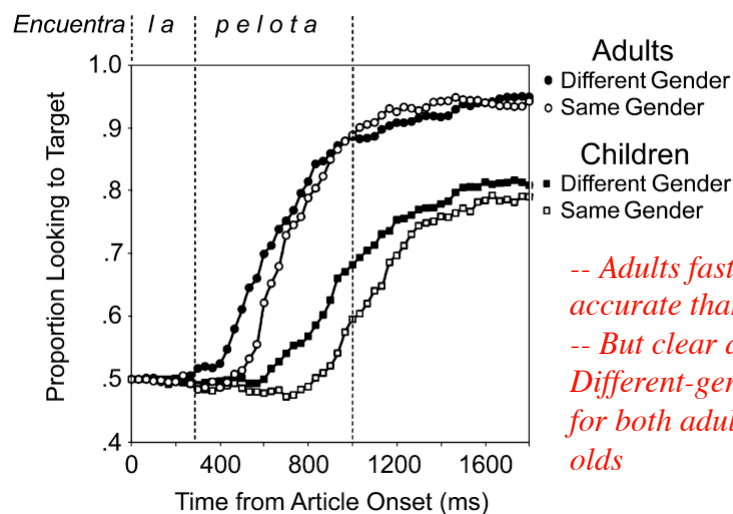
"Encuentra la pelota!"

Find the ball!

(distracter = el zapato)

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Rapid use of *grammatical gender* in word comprehension (Lew-Williams & Fernald, 2007)



-- Adults faster & more accurate than kids
 -- But clear advantage in Different-gender trials for both adults & 3-year-olds

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Rapid use of *grammatical gender* in word comprehension (Lew-Williams & Fernald, 2007)

And ... similar effects in French, at 24 months (van Heugten & Shi, 2009)

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Summary

- Early language comprehension reflects abstract grammatical categories
- Suggests children are disposed to find and generalize linguistic patterns
- ... as well as to learn the unique properties of individual words
- Toddlers' language comprehension, like adults', is *incremental*: We use each piece of information as it arrives to anticipate how the sentence might continue

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Important theme: Comprehension Precedes Production

- (1) Children comprehend the meanings of some words months before they produce any
- (2) Less over-extension of words in comprehension than production at 1-word stage
- (3) Even 1-word speakers know something [abstract] about word order.
- (4) And even 1-word speakers know something about function words.

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